Additional Agenda of the 37th Standing Committee Meeting (SCM) on Power System Planning of Northern Region to be held on 20.1.2016 (Wednesday) at 10:30 A.M. at NRPC conference Room, NRPC Katwaria Sarai, New Delhi

I. Operational Feedback from NLDC:

1.0 The operational feedback by NLDC on Transmission Constraints in Northern Region for the Quarter July 2015 to September 2015 is summarized below:

Transmission Line Constraints

S. No	Corridor	Season/ Antecedent Conditions	Description of the constraints
1	400kV Dadri-Muradnagar	Monsoon	Due to hydro generation at Vishnuprayag/Alaknanda and Uttarakhand interconnection of Bareilly Kashipur, Dadri-Muradnagar loading is under operating limit in Jul'15-Sept'15. In last year quarter (Jul'14-Sept'14), Dadri-Muradnagar loading remained higher than 500 MW for 40-45 % of time and in this year quarter (Jul'15-Sept'15), loading of Dadri-Muradnagar was in range of 500 MW for 30% of time only.
2	400kV Dadri-Greater Noida	All time	High MW loading
3	400kV Meerut-Muzaffarnagar	Due to non-availability of Vishnuprayag HEP (400 MW)	Past: Uttarakhand control area is connected to 400kV UP Grid through 400kV Muzaffarnagar –Roorkee & Moradabad-Kashipur. During high load in Uttarakhand & Uttar Pradesh and low hydro (at Vishnuprayag) in Uttarakhand, 400kV Meerut-Muzaffarnagar gets overloaded. Jul'15-Sept'15: Due to the availability of generation at Vishnuprayag and Alaknanda, Meerut ICT-4 of 500 MVA and additional lines for Uttarakhand 400kV Bareilly-Kashipur D/C, loading of Meerut-Muzaffarnagar was under operating limits. Last year (Jul'14-Sept'14), Meerut-Muzaffarnagar loading remained higher than 500 MW for 30 % of

S. No	Corridor	Season/ Antecedent Conditions	Description of the constraints
			time while in present year quarter (Jul'15-Sept'15), loading of Meerut-Muzaffarnagar remained in the range of 400-500 MW for 20-25% of time . In this quarter, reverse power flow also occurs for 10 % of time i.e. power flows towards Meerut from Muzaffarnagar.
4	400kV Singrauli-Anpara		Full generation at Singrauli/Rihand and with Rihand stage-3 Unit#5 & 6 is also evacuating through the same complex, loading of Singrauli-Anpara become very high. Due to low generation at Anpara –A, B &C and high generation at Rihand-Singrauli Complex, 400kV Singrauli-Anpara often gets overloaded. Suggestion: LILO of 400kV Singrauli-Allahabad or Singrauli-Fatehpur at Anpara so that multiple connectivity would be available for Singrauli-Anpara Or uprating of existing 400kv Singrauli-Anpara.
5	400kV Anpara-Sarnath-I & II		Connected to generating station. (Anpara-B & C)
6	400kV Anpara-Mau		Connected to generating station. (Anpara-B & C)
7	400kV Anpara-Obra		Connected to generating station. (Anpara-B & C).
8	400kV Rosa-Bareilly		400kV Rosa-Shahjahanpur D/C lines yet to be commissioned by UPPTCL.
9	400kV Mahindergarh-Bhiwani D/C		Already two more 400kV Mahindergarh-Bhiwani Lines have been approved. Commissioning of these lines needs to be expedited.
10	Underlying 220kV network of Bhiwadi		400/20kV Bhiwadi has three ICTs (3×315 = 945 MVA). Though 220kV network connectivity at Bhiwadi is;

S. No	Corridor	Season/ Antecedent Conditions	Description of the constraints
			1. 220kV Bhiwadi-Bhiwadi Raj D/C 2. 220kV Bhiwadi-Kushkhera D/C 3. 220kV Bhiwadi-Rewari (Bus split) & 220kV Bhiwadi-Mau. Both circuits connected to Haryana and import of power from Haryana is restricted through bus split. 220kV Bhiwadi-Bhiwadi Raj D/C is always loaded ~200 MW each. Any N-1 contingency at 220kV network would cause further tripping at 220kV Bhiwadi.
12	Underlying network of following substation is either not available or ICTs are under-utilized;		220kV network not available; 1. Bhiwani (Haryana) 2. Jind (Haryana) 3. Sohawal (Uttar Pradesh) 4. New Wanpoh (Jammu & Kashmir) 5. Samba (Jammu & Kashmir) 6. Shahjahanpur Underutilization of ICTs; 7. Mundka, Sonepat, Deepalpur, (Haryana), Kabulpur (Haryana), Neemrana (Rajasthan),Jaipur South (Rajasthan) & Makhu (Punjab)

ICT Constraints

S. No	ICT	Season/ Antecedent Conditions	Description of the constraints
1	Agra UP	All time	Agra UP has three ICTs of 315 MVA each. One ICT has been replaced with 500 MVA. Total transformation capacity is now 1130 MVA. Power flow over the three ICTs is more than 800 MW (for three ICTs in parallel, max loading should be 70% of rated capacity) which is not N-1 compliant.
2	Bhiwadi	All time	Three ICTs of 315 MVA each, loading is in range of ~650 MW and underlying network of Bhiwadi is also

S. No	ICT	Season/ Antecedent Conditions	Description of the constraints
			constrained due to skewed loading at Bhiwadi, Rajasthan.
3	Muradnagar	All time	All the three ICTs are fully loaded and not n-1 compliant. Loading on ICTs is more than 700MW for 20-30% of the time.
4	765/400kV ICTs of Unnao (2X1000 MVA)	Security issues of 765kV Anpara-Unnao on n-1 contingency of Unnao ICT	Evacuation of Anpara C thermal power station through 765kV Anpara-Unnao. Unnao ICTs are loaded more than ~1100MW and not N-1 compliant.
5	Mainpuri	Summer	Two ICTs of 315 MVA each loaded in the range of ~500 MW and not N-1 compliant.
6	400/220kV Dhuri ICTs (2 X 500 MVA)	Monsoon	Dhuri has two ICTs of 500 MVA each, Rajpura TPS of 2× 700 MW is directly connected to Dhuri and Dhuri is connected to Talwandi Saboo. Major part of Rajpura TPS generation is evacuating through Dhuri ICTs only and Dhuri ICTs loading are in the range of ~500 MW each most of the time during paddy season, thus Dhuri ICT are not N-1 compliant.
7	Kaithal	Summer	Two ICTs of 315 MVA each loaded in the range of 400-500 MW, loading depend upon the 220kV connectivity with 400/220kV Abdullapur, 220kV Jorian and generation at 220kV DCRTP.
8	Greater Noida	All time	Three ICTs of 315 MVA each & fourth ICT of 315 MVA has been replaced by 500 MVA ICT, loaded upto ~900-1000 MW in this quarter.
9	Moradabad UP		Moradabad has two 400/220 kV ICTs of 315 MVA each. The loading is in the range of 300-400 MW, which is not n-1 compliant.
10	Gurgaon		Gurgaon has two 400/220 kV ICTs of 315 MVA each. The loading is in the range of 400-450 MW most of the time, which is not N-1 compliant.

S. No	ICT	Season/ Antecedent Conditions	Description of the constraints
11	Azamgarh		Azamgarh has two 400/220 ICTs of 240MVA each in ring bus system. The loading is in the range of 350-450MW, which is not N-1 compliant.
12	Obra TPS		Obra TPS has two ICTs; one ICT was repaired recently after ~2 year outage but that ICT still has problem and not operating continuously.
13	Single ICTs at following 400kV Nodes:		1. Bikaner (Rajasthan) 2. Chhabra (Rajasthan) – 220 kV Modak –Badod inter regional lines is required to be opened many a times. 3. Kalisindh (Rajasthan) 4. Rajwest (Rajasthan) 5. Dehar (BBMB) 6. Bhiwani (BBMB) 7. Gorakhpur-UP (UPPTCL)

Nodes Experiencing Low Voltage

S. No	Nodes	Season/ Antecedent Conditions	Description of the constraints
1	Bhilwara	Summer	In Rajasthan, 400kV Bhilwara is continuously experiencing low voltage. In September voltage profile has slightly improved after tap changing.

Nodes Experiencing High Voltage

Whole Northern region experienced High Voltage from July'15-September'15 except few nodes. Few of them are listed below. In July the voltages were high, but as the load increased in August and September, the voltages were not that high except at few places.

S. No	Nodes	Season/ Antecedent Conditions	Description of the constraints
1	Dehar(BBMB)	All time	High Voltage
2	Deepalpur	July	High Voltage

S. No	Nodes	Season/ Antecedent Conditions	Description of the constraints
3	Kabulpur	July	High Voltage
4	Kirori	July	High Voltage
5	CLP Jhajjar(MGTPS)	July	High Voltage
6	Nuhiyawali	All time	High Voltage
7	RGTPS(Khedar)	April	High Voltage
8	Abdullapur	July	High Voltage
10	Agra(PG)	All time	High Voltage
11	Amritsar	July	High Voltage(Load reduces in September)
12	Ballabhgarh	July	High Voltage
13	Bhiwadi	July	High Voltage
14	Parbati Pool	July	High Voltage
15	Fatehabad	July	High Voltage
16	Jalandhar	July & August	High Voltage
17	Karcham Wangtoo HEP	July	High Voltage
18	Mandola	July	High Voltage
19	Mahendragarh	July	High Voltage
20	Nallagarh	July	High Voltage
21	Neemrana	July	High Voltage
22	Naptha Jhakri	July	High Voltage
23	Patiala	July	High Voltage
24	Panchkula	April	High Voltage
25	Shree Cement	All time	High Voltage
26	Sonepat	July	High Voltage
27	Dhuri	July	High Voltage
28	Makhu	All time	High Voltage

S. No	Nodes	Season/ Antecedent Conditions	Description of the constraints
29	Muktsar	July	High Voltage
30	Nakodar	April	High Voltage
31	Jodhpur	All time	High Voltage
32	Rampur	April	High Voltage
33	Talwandi Sabo	April	High Voltage
34	Akal	All time	High Voltage

Members may like to deliberate.

II. PGCIL vide letter no. C/CTU/PIG/M/SCM dated 15.01.2016 has submitted following Agenda item to be taken up in the 37th SCM

2.0 ± 500kV Rihand-Dadri HVDC works input for capacity enhancement.

2.1 The proposal of Capacity enhancement of Rihand- Dadri HVDC from 1500MW to 2500MW was discussed during the 36th Standing Committee. Constituents agreed to the proposal in-principally. However, HVPNL stated that life of HVDC terminals is about 25 years and enquired about the future plans of utilisation of existing HVDC terminals at Dadri and Rihand ends. POWERGRID stated that R&M proposed for existing Rihand-Dadri HVDC terminals is being planned and up-gradation can be taken up along with that. During the meeting it was decided that a comprehensive proposal would be prepared for consideration in the next standing committee meeting. Accordingly, the detailed proposal has been prepared. Same can be undertaken alongwith proposed up-gradation to 2500MW from techno-economic point of view and capability of controllers.

2.2 Rihand-Dadri HVDC link is an important transmission element for evacuation of bulk power from pit head generating units in Rihand and the vicinity. This HVDC link emanates in the Rihand–Singrauli-Vindhyachal belt area, where bulk low cost power generators are operational and transfers bulk power near National Capital Region (NCR) which is load center comprising of number of Industrial and vertically populated areas of the National Capital Region. This facilitates the System Operator to enable economic dispatch function by utilizing the HVDC system to its full capacity for most of the times.

Quick load control feature including the run back control in the event of outage of the Rihand generators in the HVDC Rihand-Dadri system in the past has been effectively utilized for enhancing the stability of the underlying AC network during extreme grid loading conditions.

2.3 Rihand- Dadri HVDC Bi-pole is operating at 1500MW capacity since 1992. Based on the operational feedback from POSOCO, CTU proposed that the capacity of the Bi-pole can be enhanced by 1000MW by utilizing the existing additional loading capability margin available on the HVDC bipolar transmission line. The thermal capacity of ±500kV HVDC Quad Bersimis conductor line for maximum conductor temperature of 70^{o}C at 45^{o}C ambient temperature is approx. 2350MW. Further, at ambient temperature below 43^{o}C, the thermal capacity can be higher than 2500MW. In view of above, additional 2X500MW parallel converters at Rihand and Dadri HVDC station have been proposed. Augmentation of NTPC Bus bar, connectivity at Rihand- Dadri terminal and up-gradation of existing control and protection of Rihand- Dadri HVDC bi-pole link would be required. However, with no extra land/ transmission line requirement, the continuous 1000MW additional capability of the bi-pole can be used during any exigency and would provide operational flexibility.

2.4 The existing Bi-pole system is completing 25 years and a number of equipment refurbishment/overhauling works are essentially required to be undertaken for the smooth operation of the said HVDC system in view of the sea change in the Power electronics having taken place. The designs of Thyristor, snubber circuit capacitors, Light-guides & Thyristor Control unit have migrated to next generation levels and hence the existing equipments require structured replacements to ensure continued safe operations of this link during the future.

2.5 Accordingly, the major equipment which require Replacement in full or part include Valve Hall equipments incl. Thyristors & Valve Cooling, Control, Protection & Communication Systems, DC Filters, AC Filters, AC/DC Switchyard Equipments, Valve Hall Ventilation System.

2.6 These works are proposed to be clubbed with the capacity enhancement works of the ±500kV Rihand-Dadri HVDC Link for the following advantages:

i) Sharing of the space of the existing Filters and Switchyard equipments in view of space constrains with the available aid of GIS/ hybrid technology design solutions.

ii) Enhancing the AC Filter capacity for 2500 MVA for parallel operation of the two bi-poles.

iii) Integrated control & protection for parallel operation of the existing and new bi-poles leading to flexible Operation with Master Control with parallel Converters.

iv) Reactive power control for both the bi-poles.

v) Replacement of existing Control & Protection Systems for IEC 61850 compliance.

vi) Shifting of 2 number of 400kV bays from NTPC Dadri Switchyard to HVDC Switchyard to avoid 400kV Bus capacity up-gradation works of NTPC plant and interconnection between NTPC & POWERGRID 400kV bus-bars.

vii) The Up-gradation work and the Augmentation work for 1000 MW are planned in staggered manner in such a sequence that the reduction of existing Bi-pole capacity due to Pole shutdown is avoided.

Members may like to deliberate.

3.0 Transmission system for Ultra Mega Solar Parks in Bhadla, Distt. Rajasthan

3.1 In the 36th Meeting of Standing Committee on Power System Planning in Northern Region held on 13/7/2015, inter-state transmission scheme for evacuation of 3000MW of solar power in Jaisalmer (Parewar and Fatehgarh : 2000MW) and Jodhpur (Bhadla :1000MW) was in-principally agreed. In the meeting, it was also agreed that implementation of above system shall be taken up only after receipt of LTA of at least 25% of their installed capacity from respective Solar park developers.

3.2 M/s Surya Urja Company of Rajasthan Ltd. has applied for Long Term Access in ISTS for 500 MW at Bhadla (Jodhpur) with commissioning schedule of Jan'17. Further, M/s Adani Renewable Energy Park Rajasthan Ltd also applied for Long Term Access in ISTS for 250MW with commissioning schedule of Mar'17. As per the applications, Power from above two projects is envisaged to be transferred to beneficiaries of Northern region.

3.3 Subsequently, M/s Essel Saurya Urja Company of Raj. Ltd. also applied for Long Term Access & connectivity in ISTS from its Phalodi-Pokaran Solar Park (750 MW) with commissioning schedule of Jul.'17. M/s Essel indicated drawl region as NR-400 MW and WR-350 MW from above Solar Power Park. The application is under examination/processing.

3.4 MNRE has authorized all the above applicants as solar power park developers (SPPD) to undertake infrastructural activities including arrangement for connectivity on behalf of the solar power generators in the park. Above SPPDs have also submitted an undertaking to bear

all liabilities related to Connectivity/LTA in accordance with CERC regulations/orders, on behalf of the Solar Project generators to be set up in the Solar Park.

3.5 Based on the joint visit for site selection for Bhadla Pooling station by POWERGRID, RRECL, RVPN, Developers etc., Govt land (about 130 acres) in Tehsil Bap, Jodhpur distt. was shortlisted and applied to Govt of Rajasthan for land allotment. The above site for Bhadla Pooling Station is at about 20 km distance from M/s Saurya Urja & Adani Solar Power Park whereas M/s Essel's Park is about 60 km.

3.6 M/s Adani (250 MW) and M/s Saurya Urja Co.(500 MW) desired connectivity at 220kV voltage level whereas M/s Essel (750 MW) desired it at 400kV. 220kV & 400kV D/c Transmission line from Solar Park Pooling station upto 220/400kV Bhadla Pooling station shall be developed by the respective applicants/SPPD as part of its internal transmission infrastructure. However scope of 4 nos. 220kV bays and 2 nos. 400kV line bays at 220/400kV Bhadla Pooling station for interconnecting SPPD's 220kV /400kV lines is kept under the present scope of the proposed scheme (2 nos. each for M/s Saurya Urja & Adani Renewable and 2 nos. 400kV for M/s Essel).

3.7 Further, in order to address reactive power management aspects including during low/no solar generation periods, 1x240MVAr bus reactor (765kV) & 1x125 MVAr (400kV) reactor at Bhadla S/s is proposed. For 765kV Bhadla- Bikaner D/c line also, 1x240 MVar Switchable line reactor at each end is proposed.

3.8 Considering above three (3) LTA applications for 1500 MW Solar Power transfer requirement from Bhadla Solar Complex, following transmission scheme is proposed, out of earlier agreed transmission scheme:

i) 765kV Bhadla (PG) – Bikaner(PG) D/c
ii) 400kV Bhadla (PG)- Bhadla (RVPN) D/c (Quad)
iii) Establishment of Pooling Station at Bhadla (PG) (765/400kV : 3x1500MVA 400/220kV : 3x500MVA,)
iv) 2 nos. 400kV & 4 nos. 220kV line bays at Bhadla (PG) for interconnection of solar park interconnection
v) 1x240 MVAr switchable line reactor at each end of 765kV Bhadla(PG)- Bikaner(PG) D/c line
vi) 1x240 MVAr (765kV) & 1x125 MVAr (400kV) Bus reactors at Bhadla Pooling Station

3.9 Ministry of Power vide letter dated 08.01.15 & 04.08.15 intimated POWERGRID for taking up of transmission line and pooling station from the solar generating park (9 solar parks with capacity 7020 MW) including for Ultra Mega Solar park in Rajasthan.

Members may like to deliberate.

4.0 Connectivity & LTA to GHAVP Nuclear power plant (2X700MW) of M/s NPCIL in Haryana.

4.1 Connectivity & Long Term Access for 1400MW from Gorakhpur Haryana Anu Vidyut Pariyojna (GHAVP)(2X700MW) of M/s NPCIL located at Fatehabad, Haryana was discussed in the 36th Standing Committee meeting of Transmission Planning of NR in July 2015. Connectivity was sought w.e.f. Sep.'2020. The target Beneficiaries of the project are Northern region. As indicated in the application, switchyard for evacuation will be at 400kV whereas the 220kV switchyard will be utilized to draw start-up power from the grid by 220/66kV transformation. No interconnection is proposed between the two switchyards.

4.2 HVPNL indicated that NPCIL had acquired land for 4*700 MWe units, whereas LTA application was made for 2*700MWe units. Thus the proposed scheme may need changes considering the final capacity of 4*700 MW. Subsequently CEA advised that NPCIL and HVPNL should discuss and resolve the matter and confirm the capacity for which the evacuation scheme is to be planned.

4.3 As indicated by NPCIL letter dated 12/01/2016, a meeting was held at HVPNL on 7/1/2016 to discuss the power evacuation and Start up power (220kV). HVPNL suggested that scheme should be planned for ultimate capacity of 4*700MW. However, NPCIL desired considering the present financial sanction for 2*700 MW, for which Connectivity and LTA applications have been made, it prefers to retain the same applications, rather than making new applications (4*700MW) for which no financial sanction is available. Therefore, it has been proposed by NPCIL that power evacuation scheme for GHAVP may be considered based on the earlier application (2*700MW).

4.4 Accordingly, studies were carried out considering two units in 2020 time frame. GHAVP Nuclear plant (2X700MW) of M/s NPCIL is in proximity of Fatehabad 400/220 kV substation of POWERGRID. Hence, connectivity can be granted at Fatehabad. Presently, Fatehabad 400/220 kV S/s is connected with LILO of one circuit of Moga-Hissar 400 kV D/c line. LILO of Moga-Bhiwadi

400 kV D/c line at Hissar is under implementation and therefore another 400kV D/c line would be available between Moga & Hissar.

4.5 Transmission system for connectivity as well as for evacuation of power from NPCIL generation is proposed as:

Proposal for Connectivity:

- Fatehbad - NPCIL generation 400 kV D/c line- for 1400MW

Proposal for Long Term Access:

- LILO of second circuit of Moga-Hisar 400 kV D/c line at Fatehbad
- LILO of both circuits of Moga-Hisar 400 kV D/c line at NPCIL generation switchyard
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4.6 The 400kV D/c line would help in evacuation of power from 2X700MW units & LILO would provide additional connectivity to the generation in case of contingency scenario. System studies have been carried out with the above proposal. All line loadings are well within limits under normal as well as contingency situations. System studies are enclosed at Annexure-1.

Members may like to deliberate.

5.0 Connectivity & Long Term Access to M/s Noida Power Company Ltd. For drawl of 500 MW as a bulk consumer in Greater Noida area, Uttar Pradesh.

5.1 The issue of grant of Connectivity and LTA to Noida Power Company Ltd. (NPCL) was discussed in various Standing Committee/LTA & connectivity meetings, however, the same could not be resolved. During 34th SCM held on 08/08/14, it was suggested that NPCL may approach CERC.

5.2 Accordingly, NPCL had approached CERC. CERC vide their order dated 16/09/15 has directed to process the applications. Based on the direction from CERC, UPPTCL has given the NOC for availing LTA. It has been stated in the NOC that M/s NPCL would be connected to UPPTCL substations and UP system is capable of supply of 500 MW to NPCL.

5.3 Keeping above in view, it is proposed to grant LTA for drawl of 500MW power at G. Noida 765/400kV S/s of UPPTCL through intra state system of UPPTCL w.e.f. 1/10/2017 to 30/9/2042. The grant of LTA shall be subject to fulfillment of the conditions as given in the letter & NOC given by UPPTCL. The grant of LTA shall be abide by all provisions of the Electricity Act, 2003, CERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State transmission and related matters) Regulations, 2009, Approved

Detailed procedure of CTU, CEA (Technical Standards for connectivity to the Grid) and Indian Electricity Grid Code as amended from time to time.

5.4 The already granted connectivity at 400/220kV G. Noida(new) proposed under ISTS, may be cancelled as M/s NPCL would be connected to UPPTCL substations as mentioned in NoC and UP has stated that their system is capable of supply of 500MW to NPCL. Detailed agenda for Connectivity & LTA to M/s NPCL has already been circulated among all Northern region constituents (copy enclosed).

5.5 Further, it is proposed that the scheme NRSS XXXIII consisting of establishment of 2x500 MVA, 400/220kV GIS substation at Greater Noida (New) along with Ballabhgarh – Greater Noida (New) 400 kV D/c line as agreed in the 31st Standing Committee Meeting of Transmission Planning of Northern Region held on 02/01/2013 may be dropped and already granted connectivity at 400/220 kV G. Noida (new) proposed under ISTS may be cancelled.

Members may note.

6.0 50MVAr Switchable Line reactor at Bassi after LILO of Bhiwadi-Bassi 400kV line at Kotputli

6.1 LILO of Bhiwadi-Bassi 400kV line at Kotputli was approved under NRSS–XV. The line length for the 400kV Kotputli – Bassi section was envisaged as 160 km in Detailed Project Report. Accordingly, the 50 MVAr existing line reactor at Bassi end in 400kV Kotputli – Bassi section was to be made switchable. However, the actual Line length of Kotputli – Bassi section is 106 km. Considering the length of line, the Reactor was not made switchable.

Members may like to deliberate.

7.0 Establishment of new 400/220kV substations in Northern Region:

7.1 Following new substations planned under various transmission schemes are under implementation:

S. No.	Name of Substation	MVA Capacity	Expected Schedule
1	400/220kV Kurukshetra S/Stn. (GIS)	2x500	Commissioned
2	400/220kV Parbati Pooling Station	2x315	Jun'16
3	400/220kV Dehradun Sub station	2x315	Mar'16
4	400/220kV Bagpat Gas Insulated Stn.	2x500	Mar'16
5	400/220 kV Saharanpur Sub station	2x315	Mar'16

6	400/220kV Rajghat Sub station (GIS)	4x500	May'17
7	400/220kV Papankalan -I Sub station (GIS)	4x500	May'17
8	400/220kV Tughlakabad Sub station (GIS)	4x500	May'17
9	220/66kV GIS S/s at Sector 47,Chandigarh	2x160	24 months from IA
10	400/220kV S/s at Kala Amb	7x105	Oct.'18
11	400/220kV S/s at Amargarh	7x105	Oct.'18
12	400/220kV S/s at Patran	2x500	May'16
13	400/220kV Kadarpur S/s in Gurgaon area (GIS)	2x500	38 months
14	400/220kV Sohna Road S/s in Gurgaon area (GIS)	2x500	38 months
15	400/220kV Prithala S/s in Palwal area (GIS)	2x500	38 months
16	400/220kV Baram(Jauljivi) S/s	2x315	40 months

7.2 For above 400/220kV substations, implementation of down below 220kV system needs to be commissioned for utilization of the system. It is requested that the 220kV system also gets commissioned in the matching time frame. STUs may note the above and inform the planned 220 kV system and their status from these substations to CEA and CTU.

Members may like to deliberate.

8.0 Dehradun- Bagpat line without 50MVAr Line reactor

8.1 Dehradun-Bagpat 400kV D/c line(under NRSS XVIII scheme) was initially proposed with 50MVAr line reactors at Dehradun end, as it was a radial line from Bagpat planned alongwith a new substation at Dehradun.

8.2 Subsequently, under NRSS Scheme, 400kV Dehradun– Bagpat line was planned to be LILOed at Saharanpur. The line length of Dehradun– Bagpat line was reduced & the line reactors earlier proposed at Dehradun end were approved to be shifted to Saharanpur substation as bus reactors at Saharanpur. However, both the reactors of Dehradun were directly delivered to Saharanpur in view of delay in LILO of line due to RoW issue. In the 36th Standing Committee Meeting of Power System Planning of Northern Region, the LILO of 400kV Dehradun - Bagpat at Saharanpur has been dropped and there is one 400kV line

from Bagpat to Dehradun, the other 400kV line being re-oriented as Bagpat- Saharanpur & Dehradun –Roorkee lines.

8.3 Considering that the network configuration has changed, requirement of 50 MVAR line reactors at Dehradun end of Bagpat – Dehradun line was studied. Here it may be mentioned that in addition to facilitating line charging the line reactors were proposed to control system voltage profile of the area. Since, the two 50MVAr reactors would be available in close proximity, at Saharanpur; reactors would continue to control the voltages in the area under light load conditions. Studies indicate that even with revised configuration, the expected maximum total voltage rise is within 10kV in charging the 400kV Dehradun –Bagpat direct line without line reactor from either end. Charging studies enclosed at **Exhibit-I**. Further, under steady state, voltages are almost same in the area with or without 50MVAr line reactor in Dehradun -Bagpat line. Study results without 50MVAr Line Reactor & with 50MVAr Line Reactor at Dehradun end are enclosed at **Exhibit-II** & **Exhibit-III** respectively.

8.4 In view of the above, it is proposed that the 50MVAr reactors may be retained as bus reactors at Saharanpur and 400kV Dehradun –Bagpat direct line may be operated without line reactor at Dehradun as shown in Fig. 7.1 below.

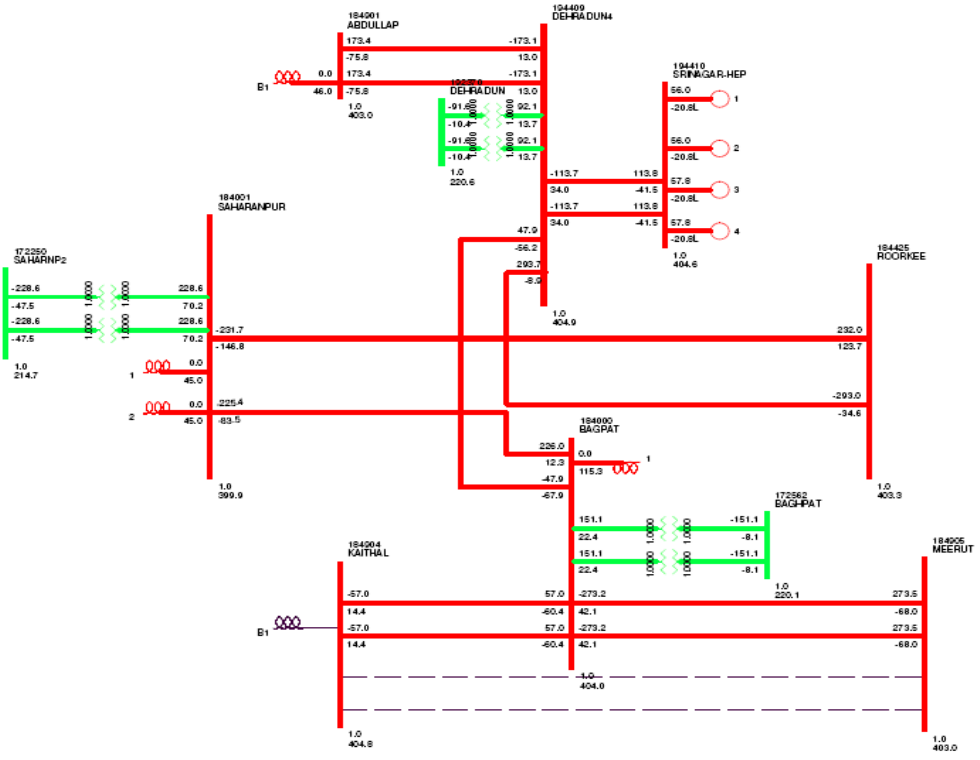


Figure-7.1

Members may like to deliberate.

9.0 Connectivity to Singoli Bhatwari HEP (99 MW) of M/s L&T Uttaranchal Hydropower Ltd. in Uttarakhand.

9.1 Connectivity application has been received in May'2015 from L&T Uttarakhand Hydropower Ltd. for 99 MW quantum of Singoli Bhatwari HEP located in Uttarakhand. Connectivity has been sought from 15th November'2017. The commissioning schedule of the first unit is December'17.

9.2 As per the application, the nearest substation present in the vicinity is Baramwari 220/33kV GIS substation under UITP (deemed ISTS). As Singoli Bhatwari generation has been identified under UITP system, therefore, the proposal of connectivity is as below:

- LILO of one circuit of Srinagar-Baramwari 220 kV D/c line at Singoli Bhatwari Generation switchyard.

9.3 However, as other hydro generations in the vicinity of Baramwari substation are delayed and due to which Baramwari 220/33 kV substation which is to be implemented by PTCUL may also get delayed, the interim Connectivity to Singoli Bhatwar HEP may be provided as below:

- 220 kV D/c line from Singoli Bhatwari HEP to Srinagar 400/220/33 kV substation.
- LILO portion may be implemented by the applicant i.e. M/s L&T Uttarakhand Hydropower Ltd.
- Other portion may implemented by PTCUL.

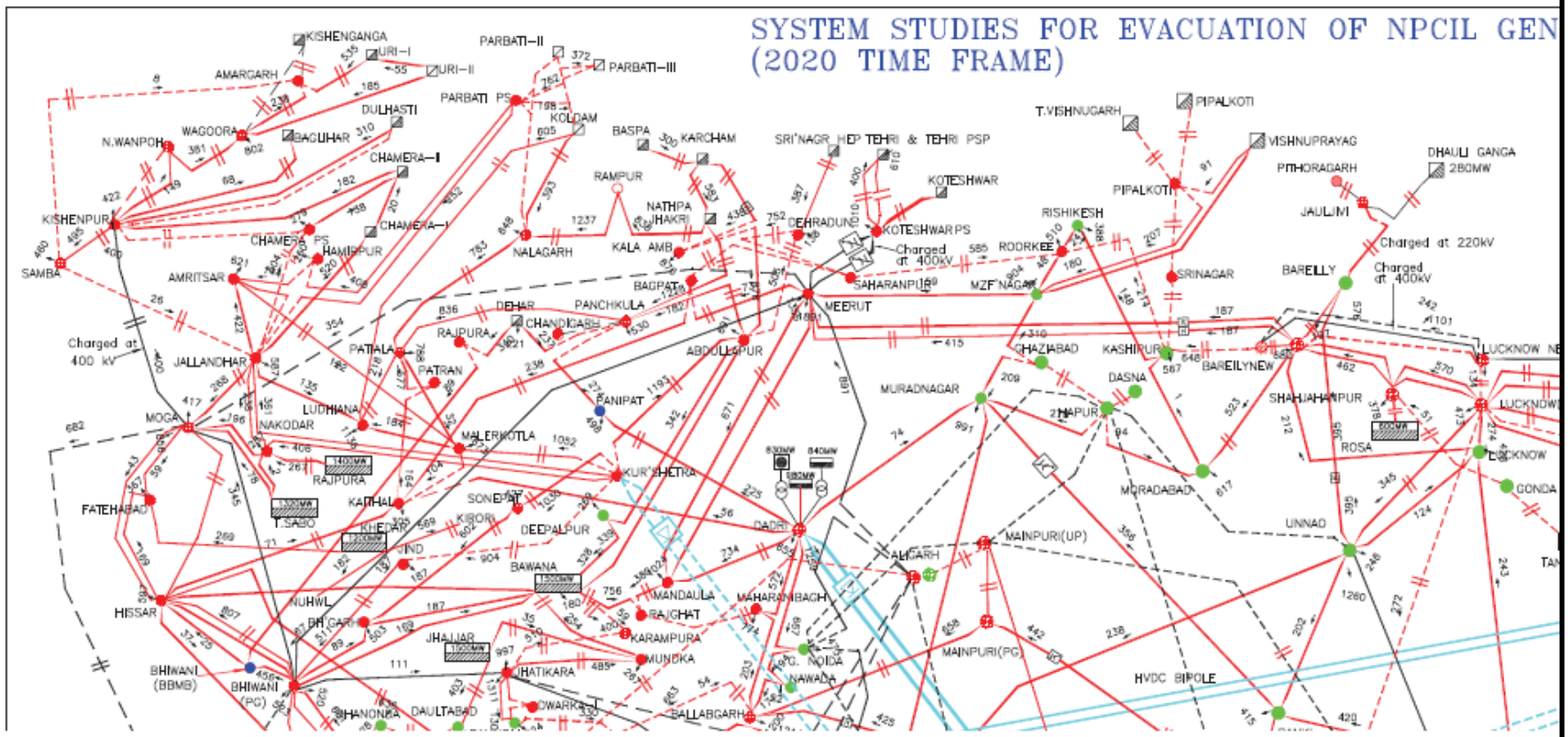
9.4 This would allow Interim Connectivity arrangement for Singoli Bhatwari generation and after the commissioning of Baramwari substation, the final arrangement as mentioned above may be taken up.

9.5 It is to mention that mere connectivity does not full fills the condition of adequacy of transmission system for transfer of power to target beneficiaries and the grant of connectivity shall not entitle to interchange any power with the grid unless it obtains Long-Term Access, Medium Term Open Access or Short Term Open Access.

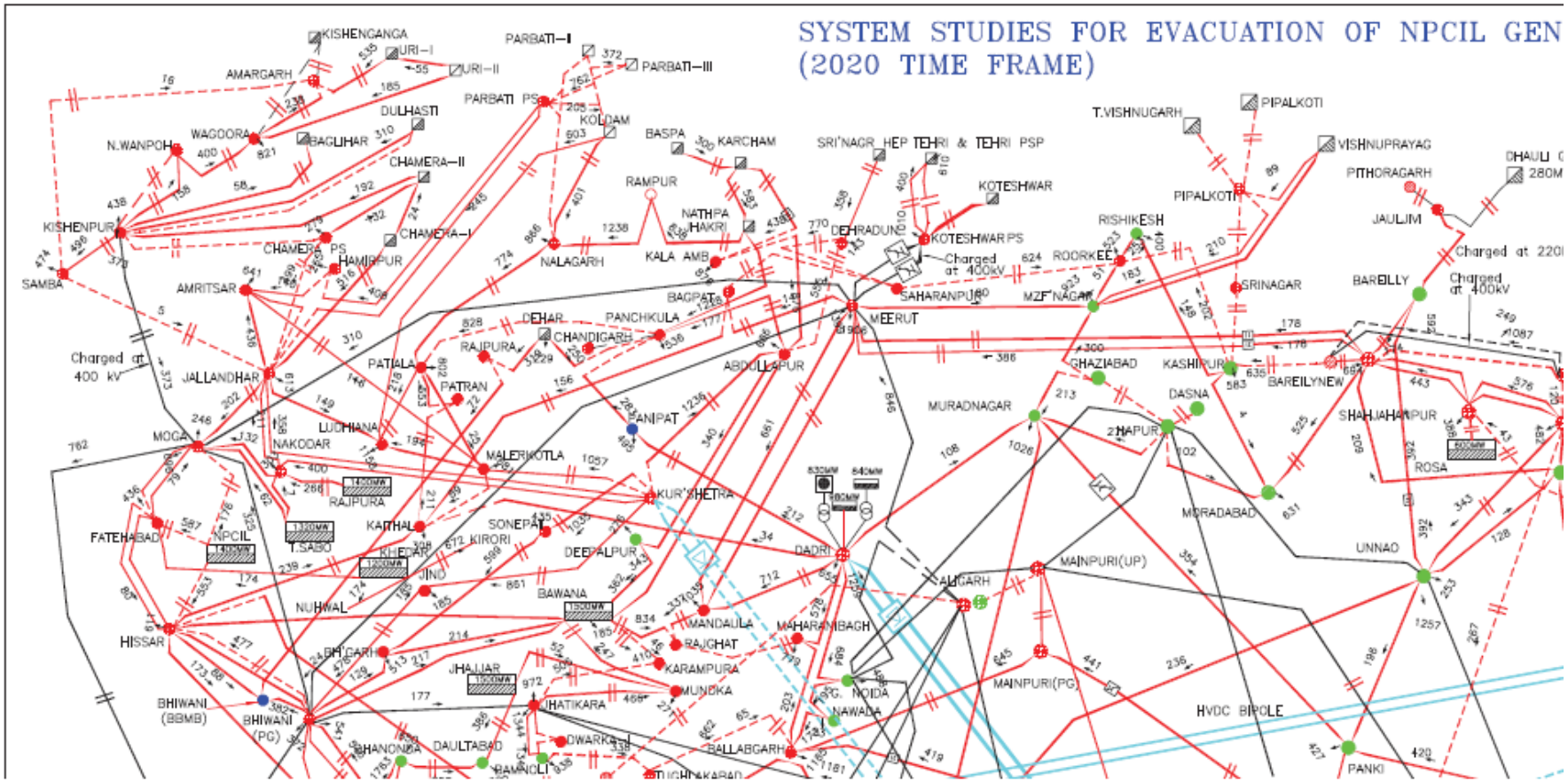
9.6 Transmission beyond immediate evacuation system is to be evolved once the connectivity applicant applies for the LTA. Accordingly, for the sake of grant of connectivity, the transmission system capability has been checked for the transmission system proposed for the immediate evacuation system only.

Members may deliberate.

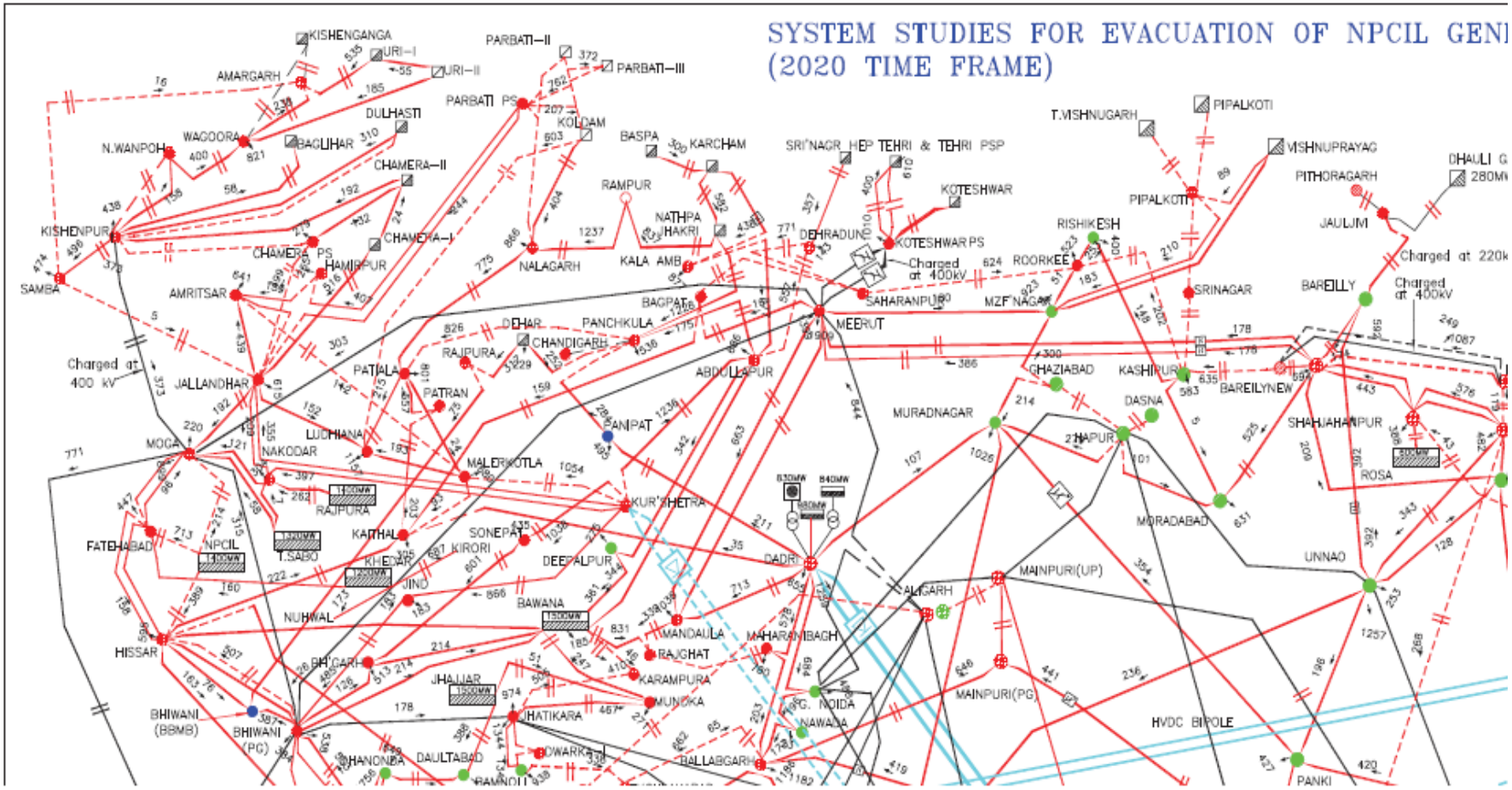
ANNEXURE-I



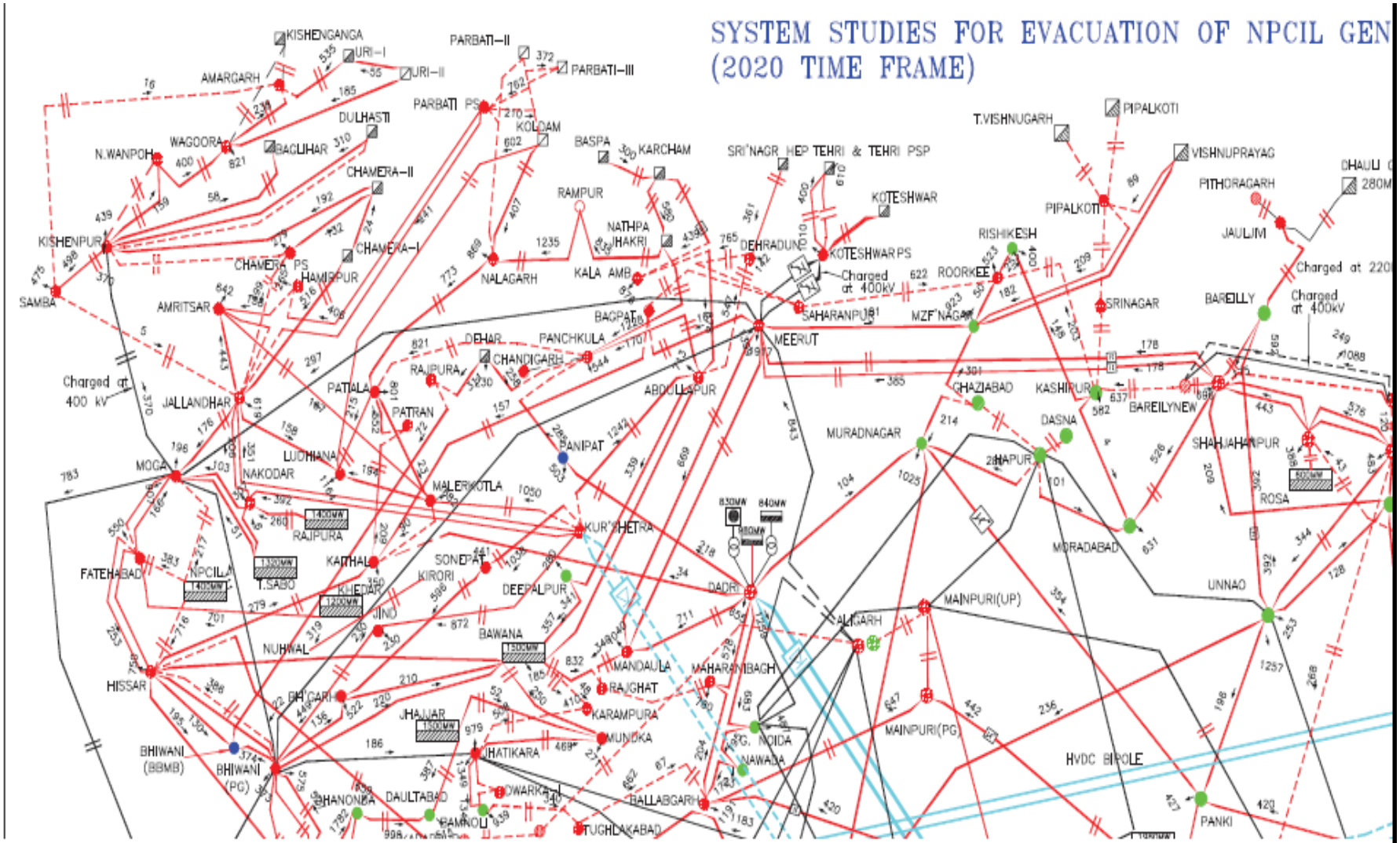
Basecase without NPCIL Generation



With NPCIL Generation



With Outage of NPCIL-Hissar 400 kV S/c



With Outage of both circuits of Khedar-Kirori 400 kV D/c line

Charging Dehradun Bagpat 400kV S/c without 50MVAr line reactor					
Charging From Bagpat					
Bagpat	Dehradun Split	Dehradun	Source Rise	Line Rise	Total Rise
401.8	-	401.9	-	-	
403.5	410	402.2	1.7	6.5	8.2
402.9	403.5	403.5	-	-	

Charging From Dehradun					
Dehradun	Dehradun Split	Bagpat	Source Rise	Line Rise	Total Rise
401.9	-	401.8	-	-	
405	411.5	402.1	3.1	6.5	9.6
403.5	402.9	402.9	-	-	

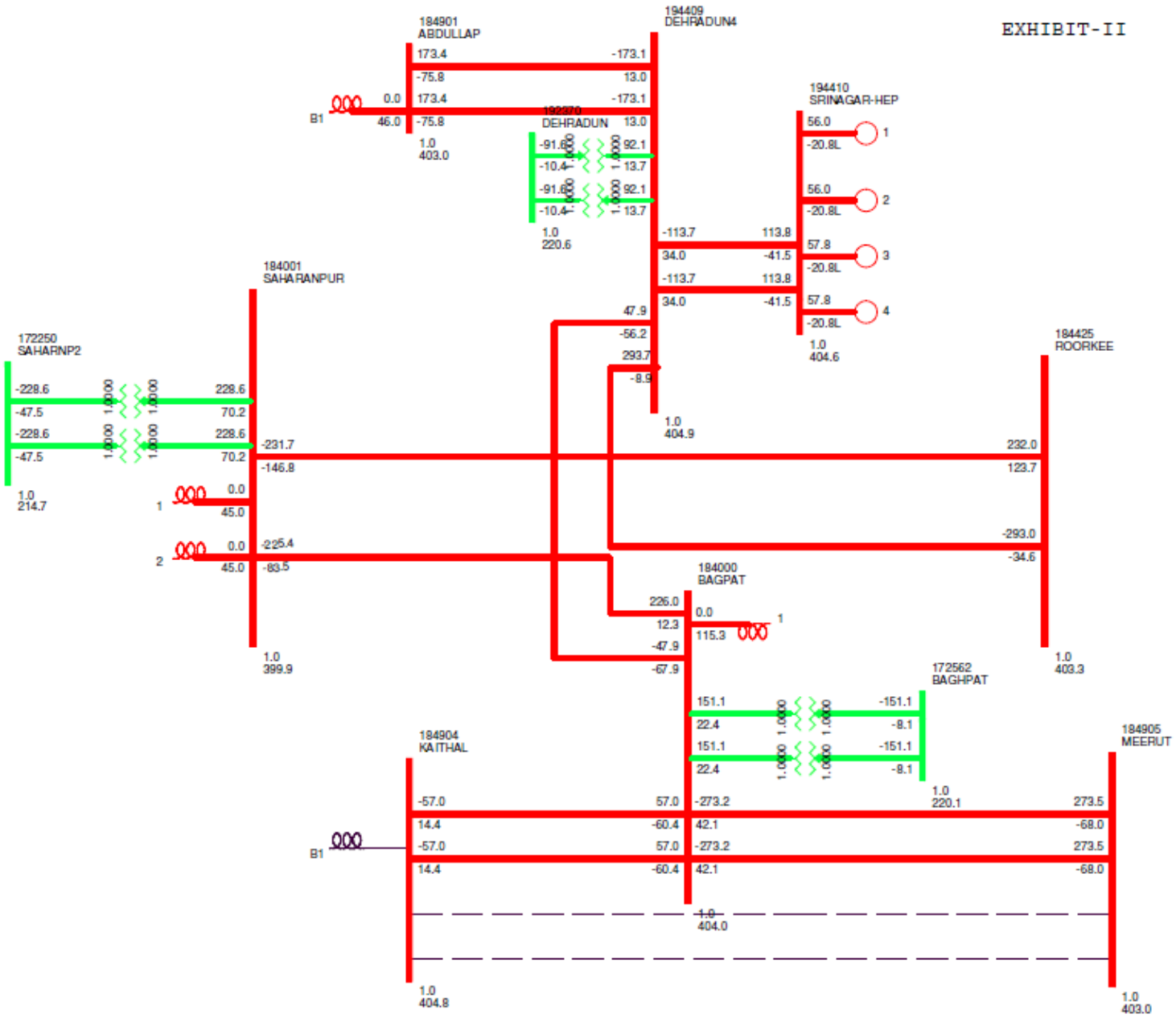


EXHIBIT-II
184901
ABDULLAP
194409
DEHRADUN4
194410
SRINAGAR-HEP
192370
DEHRADUN
184001
SAHARANPUR
172250
SAHARNP2
184425
ROORKEE
184000
BAGPAT
172562
BAGHPAT
184904
KAITHAL
184905
MEERUT
B1
1.0
403.0
1.0
220.6
1.0
404.6
1.0
404.9
1.0
214.7
1.0
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1.0
403.3
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220.1
1.0
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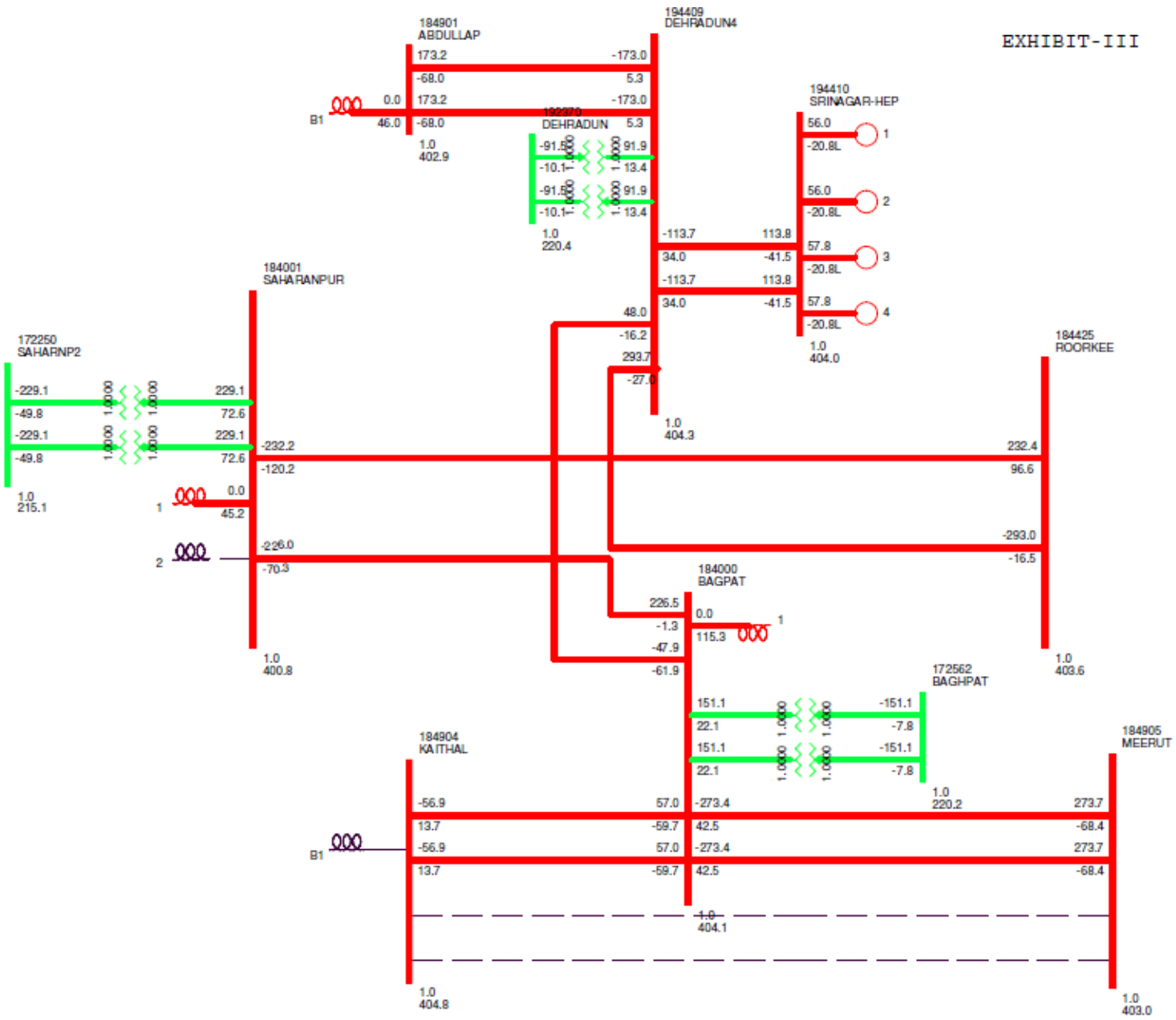
EXHIBIT-III
184901
ABDULLAP
194409
DEHRADUN4
194410
SRINAGAR-HEP
192370
DEHRADUN
184001
SAHARANPUR
172250
SAHARNP2
184425
ROORKEE
184000
BAGPAT
172562
BAGHPAT
184904
KAITHAL
184905
MEERUT
B1
1
2
3
4